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BULLETIN OF THE

TAYLOR SOCIETY

New York

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE
AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

> UNLESS I misread the facts of the present political, social, and industrial situation, we are on the threshold of an era that will be marked by changes in business and industry as far-reaching as the changes that followed the introduction of machine power in industry.
>
> —Edward A. Filene.

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Engineering Societies Building
29 W. Thirty-Ninth St.
New York

FEBRUARY, 1925 VOL. X, NO. 1

IN TWO PARTS—PART I

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BULLETIN OF THE
TAYLOR SOCIETY
AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

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Spring Meeting of Taylor Society
Ann Arbor, Michigan
May 14-16
Auspices of University of Michigan

Comment

IT IS a conviction of scientific management that where there is management in accordance with engineering principles will be found harmonious industrial relations, and where there are harmonious industrial relations will be found management in accordance with engineering principles; for agreeable conditions of work, efficient methods of work and profitable results of work are inseparable elements of a "total satisfaction situation." This is illustrated by the two books of the brothers Filene, preeminently successful and well-known Boston merchants.

THE mental attitude and motive behind the great experiment in industrial government of Wm. Filene's Sons Company were disclosed in A. Lincoln Filene's "A Merchant's Horizon." The mental attitude and motive which have made Wm. Filene's Sons Company a conspicuous business success are now disclosed by Edward A. Filene's "The Way Out," even though it is concerned primarily with the industrial problems confronting the United States. These complementary volumes offer proof that ". . . there is nothing necessarily contradictory between successful business and social progress. Success in both will demand the same principles and the same practices. Commercial success and social welfare, in the days ahead, will stem from the same root."

STATEMENTS such as the following, coming from a merchant and not from an engineer-manufacturer, are significant. Says Edward A. Filene: "American business has reached its last frontier . . . . As society develops, the pioneer must always be succeeded by the engineer . . . The business man of tomorrow must have the engineer-mind . . . We would better turn our energies to the urgent job of substituting the engineer-mind for the pioneer-mind in the American business of the future . . . If there was ever a time when business men were obliged to think scientifically in order to succeed, it is now . . . The survivors will be the businesses in which waste has been conquered and scientific method introduced." Some teachers of management in schools of business administration also are beginning to think along these lines, and are manifesting more interest in the engineer-mind and engineer technique. That is a reason why they should be brought into touch with teachers having the engineer background, point of view and technique.

BUT the engineers have been thinking along new lines also. Disposed by training and by environment to accept the governance of "the iron man," they nevertheless have been manifesting an increasing interest in social problems of industry. One of the first substantial books on human relations in industry was by an engineer—Hartness' "The Human Factor in Works Management." Robert Wolf, demonstrator of scientific management utilizing the individual's impulse to self expression through creative effort, is an engineer. Herbert Hoover, an engineer, is leader in practical efforts to regularize industry and secure continuity of employment. Frank B. Gilbreth, an engineer, investigated fatigue and monotony. Engineers have come to appreciate that there are principles pertinent to management in economics, sociology and psychology. "There are times when an excursion into economic history is just as important to business planning as the consideration of current production costs and market fluctuations." That is a reason why teachers of management in engineering schools should be brought into touch with teachers having the point of view of the social sciences.

THEREFORE the importance of the technical paper presented at the session of teachers of management at the December meeting and printed in this issue, is not determined solely by the subject-matter of the paper. It is important also because it is the joint product of a teacher of management in an engineering school and a teacher of management in a school of business administration, and because its presentation was the occasion for bringing together for the first time teachers of management from both types of schools for consideration of a common problem. It should be noted that although the authors of the paper are in essential agreement, the discussors show divergence of opinion. If more teachers of management could have been present and put their views on record, a still wider divergence between the two groups would unquestionably have been in evidence. The Taylor Society believes it has rendered a genuine service in providing the auspices for continuing cooperation of both groups in study of common problems.

MANY interesting questions arise in this matter of the teaching of management and in the respective attitudes of the engineering-school teachers and of the commerce-school teachers. Generally the commerce-school teachers disbelieve in the teaching of technique—"that can be learned in experience." But if management is a profession, one cannot disregard the fact that the older professions have learned that they must teach their respective techniques. On the other hand the engineers seem to believe that engineering training is necessary to develop the "engineering mind." But is it not probable that the "engineering-mind"—which is a different thing from engineering technique—is something the young man brings into instead of acquires from the engineering school, and may he not bring it as well into the school of commerce? Furthermore, in a recent article in the *New Republic,* C. E. Ayres, discussing the function of schools of business administration, suggests that business cannot be taught, that *business* ability is acquired by contacts with men and situations in college life and in business life, and that what is taught in the class rooms is the principles and technique of various specialized *professions* which are utilized by business. There may be something in this, and if there is, it may have a bearing on the problem of objective, curriculum, content of courses and method of teaching in higher education for management.

Management With Vision[1]

MANAGEMENT has focused its attention almost exclusively upon men and mechanisms, and the principles and laws which govern their utilization. In the past fifteen years we have developed too few executives who have done or are doing things which are inspired by vision. How pitifully few, in the multitude of executives, are the Coonleys, Dennisons, Feisses, Filenes and Kendalls of today! How few have set a new standard in managerial activity!

Men and mechanisms!—and the great actuating, energizing influence known as "management" practically neglected! Is it not a sad commentary on the industrial situation of this country that in our concern for higher wages for the individual, for better living conditions, for greater influence in the conduct of industry, for sanitation, for productivity, for quality of workmanship, for promotion, and for endless other things that have to do with man power; for speeds and feeds and automaticity, for quantity production, for reduced costs, for better quality, for lower inventories, for control of manufacturing processes, and endless other things which have to do with mechanisms; we have failed to create a great group of executives who can show anything approaching the development attained by the man at the bench or the machine used in industry.

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[1] From an address at the annual dinner of the Taylor Society, December 4, 1924, by Percy S. Brown, Works Manager, Corona Typewriter Company, Inc., Groton, N. Y.; President of the Taylor Society.

We may see, as one of the greatest boons to our country, the time when the men and women in industry may be reasonably assured of continuity of employment, and this, to my mind—and I make no pretense of voicing a new or original thought—is the greatest goal for which the executives of this country or any country should now strive. We of the Taylor Society may be justly proud of the fact that from among our membership have arisen the Washingtons and Lincolns of industry, who are now recognized internationally because of what they have done to point the way to the national attainment of this great ideal.

If the Taylor Society does nothing in the next five years to justify its existence other than to strive by every means within its power to break through the crust of reserve that surrounds the majority of industrial executives and inspire them to the great ideal of continuity of employment, to be attained through scientific study of markets and the utilization of budget control methods and such interrelated data or mechanisms as may be needed for the purpose, it will have placed itself in the position of having contributed more toward individual happiness and national stability than has been done by any organized effort since our nation was founded.

The Service Motive[1]

THE justification for any undertaking whether great or small, individual or collective, is accomplishing a service to the community. Businesses may be created primarily for profit to the investor, but unless in accomplishing this selfish aim, they render service to the community as a whole, they cannot continue to exist. Associations, whether of individuals or corporations, are usually formed for a particular service which is largely for the benefit of those taking part and only incidentally for others on the outside. But associations also must eventually serve the community as a whole if they desire to continue to exist.

The Taylor Society, more than any other association within my knowledge, has been inspired by the unselfish purpose of securing and contributing to business and the world a better understanding of sound management. For many years this unselfish aim was not generally recognized, but nevertheless, with what might almost be called religious fervor, the small group of pioneers struggled on against misunderstanding and abuse, with broadening vision and the determination to keep alive the movement inspired by Taylor.

In the earlier years of the scientific movement those on the outside who did not understand felt that the movement stood for something so scientific, so inflexible as to be impracticable. There was a time, in fact, when many a manufacturer hesitated to advocate the adoption of the Taylor philosophy, fearing the adverse criticism of his board of directors or his fellow manufacturers. But, as usually happens, prejudice and emotion have so far yielded to reason that the principles of scientific management are now accepted without question as the basis of good practice.

Fortunately, the world has moved fast in the last few years. With the development of business towards a profession, with the organization of schools of business administration all over the country, the eyes and minds of business have been opened. The time is not in the future but is at hand, when the seed that was sown by the loyal followers of Taylor will bear fruit. The old-time manager with his "strong-arm" and "hunch" methods is disappearing. Present-day conditions call for executives who are not ashamed to use the tools of the scientist—if they have proved their worth—whether for production, sales, or administration.

Strange as it may seem, there is not a modern process, not a scientific operation in industry today, that has not been influenced by Taylor's fundamental theories. That influence is slowly but surely being recognized. The new generation of executives now being educated in our schools of science and business will soon be poured into our workshops, prepared to carry on as a matter of course the principles which it is the service of this Society to make known to everybody.

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[1] From an address at the annual dinner of the Taylor Society, New York, December 4, 1924, by Howard Coonley, President, The Walworth Manufacturing Company, Boston; Vice-President, the Taylor Society.

Arbitrary Management on the Defensive

What Science in Management Means to the Worker[1]

TRADITIONAL, rule-of-thumb management in industry made a fatal slip, back in 1881 or 1882, when the authorities of the Midvale steel plant, Philadelphia, permitted a young gang boss to organize his responsibilities after a fashion of his own. When Frederick W. Taylor was permitted to substitute his early beginnings in scientific analysis and organization for the older rule-of-thumb processes, industry all over the country, all over the world, indeed, should have seen that this was the beginning of the end for arbitrary rule everywhere. There was, after that—there is, now, no permanent stopping place for the scientific analyst until every item of every process in industry is understood and approved by the most adequate intelligence that humanity can produce. And arbitrary, rule-of-thumb management, wherever it persists, waits, on the defensive, the coming of the scientist.

Workers long believed that the whole incidence of the Taylor System was directed to the increase of the employer's profits. For this reason they opposed the system in many places. They should have understood—they have since found out—that traditional methods, attitudes and relationships have never specifically favored the worker.

It may even be that industrial management was first induced to accept the Taylor idea because it seemed to promise increased profits, at small additional outlay. If so, here is another proof that business men sometimes buy either more or less than they agree to pay for. Management should have been forewarned that science is not likely to give up, at any arbitrary wish or command, an unfinished task.

Those early analyses had to do with physical factors involved in specific operations. Management relished this and the workers did not—for the most part. But in those days science had no technique with which to probe any of the other processes involved in industrial operations. And, anyhow, the establishment of the scientific ideal with respect to objective factors and in the elimination of obvious wastes was not an undesirable first step. Waste serves no good purpose; and management must learn to respect science, since, in the long run, the impact of the new method will be most severely felt on the side of management.

The intervening years have provided a new technique. Analysis is now rapidly passing over from the consideration of the old physical processes to the uncovering of those many intimate moral and emotional factors which under all conditions of industry implicate the worker in his work and which help to determine, not alone his present effectiveness in his present work, but also his wider relationships to his whole environment and, therefore, his ultimate effectiveness in the industrial order and his human significance in and to the community which supports and is supported by industry. This new technique is that extension of the psychiatric approach which is coming to be called industrial psychology.

At the December, 1924, meetings of the Taylor Society, in New York City, the significance of this wider analysis was set forth by Dr. Elton Mayo, in an address on The Basis of Industrial Psychology. It is impossible to summarize that address here. It appears in full in the December number of the Taylor Society Bulletin. The spirit of it—its promise for the future of the workers and the standpoint of the emotional release of the workers and the humanization of the whole industrial complex—may be found in the following single quotation:

"Taylor confined his attention, upon the whole, to the problem of irrelevant synthesis or mistaken coordination in our muscular apparatus; there is urgent need to extend this inquiry to discover what irrelevant syntheses of emotions and ideas are imposed upon workers by indifferent education and unsuitable conditions of work. I use the term 'worker' here to include proprietors and managers as well as machine operators."

The address was characterized by one of the hearers who took part in the discussion as "the most important message ever delivered to industry in America." As applied to the content of this particular address, the statement may be an exaggeration; but as applied to its import, it was but a simple statement of fact. Arbitrary, rule-of-thumb industrial management is more and more on the defensive. When the management engineer and the industrial psychiatrist have finished their work, every rule-of-thumb cranny in the industrial world will have been cleaned and swept; every traditional and arbitrary management will have been discharged; and industry will have become, under the direction of intelligence and good will, the effective and human means by which the community provides for its inclusive economic needs and desires.

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[1] An editorial by Joseph K. Hart reprinted by permission from *Survey-Graphic,* January 1, 1925. The caption is ours.

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The Content of Courses in Management[1]

An Important Educational Problem Considered from the Points of View of the School of Engineering and the School of Commerce

By JOSEPH W. ROE[2] and NATHANIEL G. BURLEIGH[3]

WE HAVE, in the various universities and engineering schools throughout the country, curricula variously designated by such titles as Industrial Engineering, Engineering Administration, Industrial Management and Business Administration, the object of which is to prepare for executive work in industry. No one pretends for a moment that they fit students for the higher executive positions. Their graduates must start with other young men in the lower ranges and work their way up on the basis of proven merit. They should, however, help toward more rapid development into the higher ranges.

The practice in the general field covered by these courses has been developed chiefly by the mechanical engineers on one hand and by business executives on the other. The teachers have, however, done much to develop the presentation of the facts and broaden the principles involved.

The engineers have come into the field almost unconsciously. Mr. Taylor's own life work illustrates this clearly. As a young machine-shop foreman he was confronted by the problem of securing better output in some other way than by driving the workers. He decided that the first step should be the substitution for guess of precise knowledge of what should constitute a day's work. He started his investigation at the point of the cutting tool to answer three detail questions, all of them well within the technical mechanical engineering field; namely, "What feed shall I use, what speed, and what depth of cut?" To get a complete answer to these questions his characteristic thoroughness forced him to widen his inquiry until it finally included a whole system of management. His successors, in developing production methods, have been compelled to take into consideration not only the production program but the sales program, business cycles and finance.

When the Institution of Civil Engineers was founded, about a hundred years ago, it defined engineering as "the science of utilizing the forces and materials of nature for the benefit of man." When the Federated American Engineering Societies was formed five years ago it was recognized that this definition was no longer broad enough, and the following significant clause was added—"and the art of organizing and of directing human activities in connection therewith."

On the other hand, business executives are coming to recognize that while the making of profits is an obvious and direct purpose of industry, its ultimate and permanent purpose is the efficient production of goods and services. This has drawn them into the engineering field, especially into that twilight zone, not *necessarily* engineering, covered by the second clause above, and into the use of such engineering methods as analysis and test.

With respect to the various professional societies the chief contributions to management have come from the engineers. The Transactions of the American Society of Mechanical Engineers contain the most important contributions to the science of industrial management. The contributions from the economists, business men and bankers have come later and have been less dynamic.

In the field of education there has been less discrepancy. Both the schools of commerce and the schools of engineering took up the teaching of management as soon as a science of management came to be recognized, the schools of commerce earlier perhaps than those of engineering. They too have been moving toward each other, at least in this field, and a comparison of their catalogues shows an overlapping of courses reflecting the conditions in industry.

At a recent meeting of this society the subject of this overlapping came up, and the present writers were asked to present a paper discussing it. Can a single curriculum cover the whole ground, and if so who should teach it—the schools of engineering or the schools of commerce? The writers of this paper, one of them a graduate from the arts and commerce courses and the other from an engineering course, unite in believing that the one curriculum cannot cover the field adequately. There should be at least two general types of curricula, one an engineering course, broadened on the business and executive side, the other a course in management, with some instruction in the engineering field.

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[1] Paper presented at a meeting of teachers of management under the auspices of the Taylor Society, New York, December 5, 1924.

[2] Professor of Industrial Engineering, College of Engineering, New York University.

[3] Professor of Industrial Organization and Management, Amos Tuck School, Dartmouth College.

It has been estimated by the Joint Committee of the Society for the Promotion of Engineering Education and the National Industrial Conference Board that there are approximately 750,000 persons occupying positions of executive leadership in American industry. The demand for replacements and for additional personnel is so great that all possible sources should be drawn upon to the fullest extent. Some of these positions, possibly 20 per cent, are purely technical in character and some are purely financial or commercial, but the larger number represent various shades of combination in between. One type of training would be too narrow, and at least two broad types having certain things in common are desirable, one emphasizing technical production methods, which we shall hereafter refer to as the engineering type, the other with the chief emphasis on commercial and financial technique and industrial control, which we shall refer to as the commerce type. If two types of curricula are desirable, what should they have in common, wherein should they differ, and how can they best be taught?

There are three methods of setting up a college curriculum:

(1) By comparing those now being taught in the standard colleges and building upon existing teaching practice;

(2) By asking industrial leaders what they need and supplying what they call for;

(3) By analyzing the field of industrial management and the problems of the executive in industry, segregating the elements, providing studies in preparation for these elements, and then combining them into a curriculum.

None of these three methods alone gives a satisfactory basis. To build up a course on the basis of comparison is merely to perpetuate existing practice, which may or may not be the best. Anyone familiar with the compromises and cross currents which enter into the making up of a college curriculum will realize how far from perfect it is, even in the minds of those responsible for it. Furthermore, improved industrial methods are constantly developing and of necessity the curricula lag somewhat behind these ever-changing conditions. Progress is not assured by plans which are the result of the average of present performances. The element of analysis must be present. Mr. Taylor proved this long ago.

The second method, finding out what the industrial leaders want and providing it, appears more reasonable, but anyone who tries it will soon find out the trouble with it, namely, confusion of counsel. It is not only unwise but impossible to set up curricula to suit everybody. One man wants only a grounding in fundamentals; others insist upon preparation for specific types of work, each of them insisting on preparation for his particular field, until it is impossible to provide all the specialized training demanded. A curriculum which one industrialist will insist on would be absolutely taboo to another; so that, in the final analysis, the problem must be worked out on its own merits by those who have undertaken the responsibility of finding the answer, on the basis of the third method. This should not be relied on alone, however, but should be checked up by the other two. We have a familiar analogy in the automobile field. Various manufacturers have, with varying degrees of success, tried to meet the demands of the different classes of consumers. Mr. Ford, however, after careful study, decided the type of automobile we should ride in. He proceeded to make it, and today most of us are riding in it.

Assume that we shall follow the third method; let us see whether the field of industrial management can be broken down into elements. There is no generally recognized "break-down" of management. There has been published recently, hwever, "Management's Handbook," which aims to cover in a comprehensive way the practice in this field. In this hand-book industrial management is broken down into thirty-two sections, as shown in Table 1, page 7.

This is a good breakdown for the purposes of the editors, but it is not all-inclusive or ideal for our purposes, as it very properly omits certain educational prerequisites not needed in a professional reference book, such as General Science, History and English Literature. For our purpose we should add also Sales Management, Advertising, Commercial Law, General

Table 1. Break-Down of the Field of Management

No.	*Sections or Elements*	*Covered in Table 2 by*
1.	Tables and Statistics	B17
2.	Mathematics	A2
3.	Charts	B17
4.	Management Ratios	B7, C7, C9
5.	The Industrial Plant	B6, B8, C2 to C8
6.	Plant Layout	B8, C8, C10
7.	Office Management	C15
8.	Forms	
9.	Classification and Symbols	B19
10.	Purchasing and Storeskeeping	B19
11.	Tool Storage and Issue	B19
12.	Production Control	B19
13.	Control of Quality	B19
14.	Materials Handling	C8
15.	Operation Study and Rate-Setting	B19, C12
16.	Wage Payment and Timekeeping	B19, C12
17.	Simplification and Standardization	B19
18.	Plant Maintenance	B19
19.	Conserving and Salvaging Materials	B19
20.	Packing for Shipment	C17
21.	Traffic and Shipping	B9, C17
22.	Economic Principles	A4, B5
23.	Organization for Ownership (Includes Finance)	B19, C9
24.	Organization for Operation	B19
25.	Budgetary Control	C13
26.	Cost Accounting	A7, B7
27.	Cost and Profit Variation Formulas	B7, C9
28.	Banking Relations (Includes Finance)	C9
29.	Insurance	B19
30.	Market Analysis	B11, C1, C3
31.	Labor Maintenance	B15, C19
32.	Information Filing System	
	Additional Elements	
	Sales Management	B11, C1, C5
	Advertising	B11, C3
	Commercial Law	B13, C11
	General Accounting	A7, B7
	Credits	C7

Accounting and Credits. For want of a better classification, however, we take this "breakdown," with some additions, as a working analysis of the field. Part of sections 1 and 3, and all of sections 2 and 32 are general in nature and not peculiar to management. Section 8 covers a service element running through all the others. In this book the element of finance is covered under section 23 for those phases dealing with the organizing of a company and under section 28 for those dealing with its operation. Reference numbers are given at the right of Table 1 to show how the various courses in Table 2 tie in with the elements listed in Table 1.

Various courses are now offered in preparation for these elements as listed in Table 2, below, in three groups, A, B and C. It may be that there are other courses which should be included. If so, it is the purpose of the discussion to bring that fact out.

Table 2. Course of Studies in the Management Field

Group A. Fundamentals Common to both Engineering and Commerce Type of Curricula.[4]

1. English Composition and Literature
2. Mathematics, up to Calculus
3. Science, not less than one year of Physics or Chemistry, preferably a year of each
4. Elementary Economics
5. Industrial History
6. Psychology

7. Elementary Accounting
8. Political Science
9. Modern Language

Group B—Intermediate Courses

Commerce Field	*Engineering Field*
1. Business English	2. General Engineering Drawing
3. Modern Language	4. Elementary Machine Design
5. Advanced Economics	6. Shop Methods and Equipment
7. Advanced Accounting, Cost Analysis	8. Plant Layout
9. Economic Geography, Transportation	10. Calculus
11. Marketing, General	12. Mechanics
13. Commercial Law, Elementary	14. Materials
15. Industrial Relations	16. Hydraulics
17. Statistics	18. Surveying
19. Industrial Organization and Management, (Comprehensive course or group of courses which should include Production Control)	20. Cooperative Work in Industry
21. Cooperation in Business	

Group C—Specialized Courses

Commerce Field	*Engineering Field*
1. Advanced Marketing	2. Heat and Power Engineering
3. Advertising	4. Electrical Engineering
5. Foreign Trade	6. Tool Design
7. Finance and Credits	8. Materials Handling
9. Banking and Investment	10. Advanced Plant Design
11. Advanced Commercial Law	12. Job Analysis and Rate Setting
13. Budgets	
15. Office Management	
17. Traffic and Shipping	
19. Personnel Management	

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[4] We agree on items 1 to 6. Professor Roe would add item 7. Professor Burleigh would add 8 and 9.

The studies in group A are fundamentals common to both the engineering and commerce type of curricula. Many of the commerce schools and some of the engineering schools are upon a graduate basis. In such schools some of the courses in Group A will have been taken in undergraduate courses, in which case they need appear here only as required prerequisites. The second group, B, covers intermediate studies more or less general in nature. It is divided into two columns, first, those in the general commerce or economic field, and, second, those in the engineering field. Group C shows specialized studies, similarly divided, most of them clearly defined as to the field in which they belong.

All students in both types of the course should take the studies in Group A. Students in the commerce courses would have practically all of B and C in the commerce field, together with some in the B engineering list. Students in the engineering curricula would take most of those in the B and C engineering groups together with some or most of those in the B commerce group. Of the engineering studies to be taken by the commerce men, those most useful would be B2 to B8. Of the B commerce studies taken by the engineering men, B3 and B5 are the only ones which can be omitted.

Students of both types should have a thorough, comprehensive course in Industrial Organization and Management, B19. It is listed here on the commerce side, but it really belongs no more to one side than the other. Into this course may be gathered and correlated a considerable number of the elements in Table 1 which do not justify separate courses. Calculus, B10, for the engineering may not be essential, but we feel it is desirable for its analytical training. In general it will be found that more of the commerce type courses are taken by the engineering students than the reverse. Mr. Burleigh points out as the reason for this that most of the B commerce courses are *essential* for the engineering schools, while engineering courses are *desirable* for the business schools. It is therefore natural to find more business type courses in engineering curricula than the reverse.

You will note that we refrain from outlining specific curricula. We are both familiar with faculty meetings engaged in this occupation and do not wish to turn this into a faculty meeting. There must of necessity be variation between the curricula of the various schools, even of the same type, i.e., commerce or engineering, owing to different constituencies and different economic conditions. The needs of the territory served by the University of Colorado, for example, differ materially from those of M. I. T. or the University of Georgia. The fundamentals, however, are the same in all cases.

As to methods of teaching, with which this paper is not especially concerned, we feel that outside lecturers should be used as far as possible, certainly in the more professional parts of the field. These lecturers should be men of experience either in business or engineering practice in the particular subject covered by them. Furthermore, if an engineering school undertakes the teaching of business subjects, that teaching should be conducted by men of the business school group, and vice versa, so far as the facilities of the school make this possible. Text books are, of course, necessary in many courses and they form an excellent background for any course, even though the problem method of teaching be used. Their special field is in courses where the subject must be covered briefly and comprehensively. Where there is time and opportunity, we feel that the problem method is far superior. The law and medical schools have used this to great advantage. Commerce and engineering schools have only begun to use the method, and we feel it can go much farther.

The engineering type of curriculum should provide a *thorough* training in the planning and execution of effective production methods. By far the greater proportion of our industrial enterprises now involve engineering and this proportion is steadily increasing. Many industries, which have been hitherto more or less empirical, have by sheer increase in the scale of their operations come to involve engineering. The commerce curriculum would furnish the natural training for those going into financial institutions and merchandising organizations, where engineering either does not appear at all or only in a secondary way.

Both writers of this paper feel strongly that whatever else engineering and commerce types of courses may have in common, some form of cooperative work in industry is vital in preparing for executive work in either field. Whatever the technical requirements may be, the executive's major job is to work with and direct men, and to coordinate their efforts toward some common purpose. This involves knowledge of human nature, and of working and operating conditions. These cannot be taught in college. There is no text book on human nature. The only way such knowledge can be acquired is under actual working conditions, working for real pay, among real workmen. Only in this way can a student learn what workmen really think and how to speak their language. This contact with workmen can be had after formal education, as hundreds of cases show. It is much more effective, however, when it is acquired during, not after, the educational process, as it gives a meaning to the studies, vitalizes the student's interest, helps him to find himself, gives a realization of the limits imposed on theory by practice, and obviates much of the painful readjustment so common after graduation. Furthermore, it offers opportunity for developing material for the case method of teaching.

The essentials of the cooperative method are, first, that the experience should be acquired during and not after the college course, and second, that the practical work be directed and properly coordinated with the college work. The exact length of the period is not of major importance. Enough applications of the cooperative plan are now in operation to show that it can be applied to widely varying conditions. The University of Cincinnati is now applying it in its School of Commerce with the same success obtained in connection with the College of Engineering. The writers both feel strongly that it should be an essential part of both the engineering type of course and the commerce type of course, and that it is no more important for one than for the other.

Discussion

H. S. Person,[5] Chairman: It is a pleasure to preside over this session; it helps me to believe that my leave of absence from the teaching of management has not compelled me to forfeit all of my earlier status and contacts.

The subject we are considering is not a new one—it is as old as is the teaching of management. But there is something new in this particular consideration of it; it is the first time that teachers of management from schools of commerce and from engineering schools have joined in discussion of a common educational problem.

The Taylor Society is happy that it has been able to take the initiative in inaugurating joint consideration of this and, we hope, of other common problems. Each group of teachers represented here has something of value to contribute to the other. Engineering schools are beginning to add to their original curricula courses which were once assumed to belong exclusively to the school of commerce; and schools of commerce are beginning to believe they should add to their curricula courses once assumed to belong to the engineering schools. In state universities having departments both of commerce and of engineering the problem of division of labor is becoming acute, for educational institutions are feeling the pressure of high costs and becoming interested in the elimination of the waste of duplication of effort.

Is there not promise of large constructive results if we approach the problem of content of the management curriculum, and the problem of who should give instruction in the elements of that curriculum, from the point of view of the university having an engineering school and a school of commerce, each teaching management and each under the necessity of working out its specialized but coordinated and economical effort toward one common purpose? Then any school of commerce not in juxtaposition to a school of engineering, and any school of engineering not in juxtaposition to a school of commerce, can define its particular purpose and organize for achievement in terms of deviation from a standard of engineering-academic cooperation which has been established under most favorable conditions.

Industry is a large and complicated social institution with many and diverse elements; but elements which, however diverse, are functionally related and more or less in functional balance. And in this diversity of elements any medium-size enterprise is an epitome of the whole of industry. Within the range of elements in enterprise are the design of product, the invention and utilization of technical processing equipment, the control of processing, the determination of market requirements and tendencies, the utilization of social instruments such as transportation and banking, the problems of taxation, political influence, and human relations. Among these elements are constants which may be brought under control, and also many variables which cannot be brought under control, but with respect to which, perhaps, probabilities may be established. There are elements emphasizing knowledge of things, others emphasizing knowledge of human nature, and still others emphasizing knowledge of social customs. Surely the range of diversity in industry offers opportunity for the engineering school and the school of commerce to perform a joint service, each master of a specialty coordinated with the other's specialty in the integral task of training managers for industry.

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[5] Managing Director, Taylor Society; formerly Director and Professor of Organization and Management, Amos Tuck School, Dartmouth College.

This integral task may be analyzed from various points of view, but for our purpose the following major functional activities seem to stand out as essential objectives of training for any course in management which aspires to be inclusive:

A. The discovery, design and improvement of the product;
B. The design, improvement and maintenance of plant and equipment;
C. The design and utilization of methods of processing—production engineering.
D. The investigation and analysis of social need and use—industrial engineering—sales engineering;
E. The distribution of the product to individual consumers—selling;
F. Specialized activities auxiliary to the activities enumerated above, involving the utilization of social instruments or observation of social regulations with respect to credit and banking, transportation, tariffs and taxes, insurance, labor laws, technique of foreign and domestic commerce, accounting, social customs and prejudices;
G. General administration or the coordination of all activities in an enterprise.

It is obvious at first glance that A, B and C have as their foundations the sciences emphasized in engineering school curricula—physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, and so on. It would be natural for schools of engineering in establishing courses in management to emphasize those functions of enterprise indicated by A, B and C; and such has been the historic fact.

It is also obvious at first glance that D, E, F and G have as their foundations the science of economics and other subjects of instruction in academic curricula, and that academic institutions establishing courses of management would naturally emphasize elements of enterprise indicated by D, E, F and G, and that their instruction in management should be organized and administered by a department of economics. Such has been the historic fact.

But although academic institutions, which were the first to establish courses in management, began by emphasizing elements D, E and F and G, they have recently begun to endeavor to include C within the field of their instruction. And engineering schools, which later established their courses in management by emphasis of A, B and C, have recently begun to endeavor to include parts of D, E, F and G.

Does there not begin to emerge from this analysis a number of tentative conclusions which may serve as an approach to the problem of organization for the teaching of management in a university having an engineering school and an academic school?

1. The university should consider itself an integral whole with specialized parts, these parts to be utilized in coordination, according to their several capacities, to contribute to the economical achievement of any purpose of the university.

2. Training for management, from the point of view of total service to industrial society is an undertaking of so wide a range that neither the engineering school nor the academic school of commerce can satisfy its complete requirements.

3. The engineering school and the school of commerce should be brought into vital cooperative relationship in the teaching of management, each contributing to the students of both schools those facilities which it is best prepared to contribute.

4. The engineering school is presumably best equipped to teach the courses concerned with A, B and C, and the academic school to teach those courses concerned with D, E, F and G; but it is not unlikely that facility to teach the courses concerned with C and D would be determined by local conditions, both faculties perhaps joining in instruction in these subjects.

It is not suggested that any one student could take all the courses offered by the engineering school and the commerce school in combination; but from the point of view of the university's service to its constituency, most economical provision would be made for training within the entire range of the requirements of industry, any one student being afforded the opportunity to train intensively in that section of the range in which he has especial interest and for which his qualities fit him.

H. P. Dutton[6]: Most of us, I think, will agree in general with the recommendations the authors have made for a course in Industrial Engineering. In a first discussion of this subject, however, I feel it would be well to bring out certain points which were perhaps assumed, but are not explicitly set forth, in the paper.

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[6] Associate Professor of Factory Management, Northwestern University School of Commerce.

What kind of a man do we desire to train in an industrial engineering course? There is the routine type of worker, the bookkeeper, the clerk, the foreman, the skilled worker. Most of us recognize that, while there is a need for the training of such men, the task is not that of the university. Secondly, there is the professional worker, the accountant, the time study man, any one of various specialists, who must acquire skill in applying to specific situations, principles and decisions formulated by other men. The routine worker and the specialist will be useful by-products of any college course, yet I do not think that the school which stops there is performing its full duty to the community. The greatest need is for leaders—for executives competent to make, as well as carry out, decisions; for pioneers and investigators in the study of business.

Can we train such leaders? Because one vital element in leadership is originality, we probably can never count on the college to manufacture leaders. College teaches the things men have reduced to the general body of knowledge. The genius of leadership is to break out in a new spot, to see the opportunity, the relationship, that no one else has seen. But while we cannot supply originality we can stimulate it, can discipline the man to consolidate its gains. We can give to many lesser men, who never will be geniuses, the ability to lead in a less transcendent but nevertheless useful fashion.

What can education do for a man, to produce such leadership? It seems to me that one purpose of education is to impart to the man information and points of view which will stimulate his imagination and sympathies, give him a sense of the relationship of facts, broaden his thinking, orient him in the world he is to enter. The study of history, of literature, of the sciences from the broader philosophic point of view, the contact with men of personality, serve this first purpose.

A second purpose is discipline. Such subjects as mathematics, logic, science, economics and accounting lend themselves admirably to training in clear, accurate, and organized thinking. It has been the strength of our engineering courses that to a high degree they have been developed into instruments of such a discipline. I should be loath to see them diluted to any substantial extent by a collection of purely informational courses in management. When we can secure the same discipline from management courses, or integrate them with engineering courses to produce such results, well and good. Until then I hope that the work in management, for engineers, will be confined to a very few fundamental courses which can be added without disturbing the present plan.

It is one of the problems of teaching commerce, to secure this disciplinary value. Our trend at Northwestern has been to make economics and accounting the backbone of the course from this standpoint, requiring economics, particularly, in large doses, so that the student thoroughly masters this subject.

A third object of education is one in which the colleges are today perhaps weakest. Self-discipline and the effective ordering of time, initiative, ability for independent action, ease and confidence in social contacts are left too largely to the extraneous activities of college life. The better student does get something of all this out of college but he does it largely on his own. A stiff course has its value in forcing the man to organize his efforts. Athletics and student projects also contribute.

The fourth purpose of education is the imparting of technical information and skill. The student needs a certain amount of specialization to give color and point to his studies. Beyond that, technical specialization seems to me to be wholly out of place in the undergraduate commerce course. Technique changes rapidly, it varies from industry to industry. It can be much more cheaply acquired on the job, by night school work, or by a return for post-graduate work after the man is started and knows what he wants. I believe the future will see a great growth in the work of evening, extension, and correspondence schools, as the value and need of such post-graduate training is realized.

To sum up and apply all this to the course in Industrial Engineering: it seems advisable that in both commerce and engineering undergraduate courses we should avoid too great a degree of specialization. We should be slow in hybridizing our excellent engineering courses with commerce and in our commerce courses we should seek a further development of the disciplinary side of the course. And we should study our college curricula, not from the standpoint of seeing how much we can cram into a man's head, but from that of producing men, men who approach the problems of business, of citizenship, of life, with perspective, with imagination, with the habits of organized thinking and action.

J. A. Fisher[7]: In the first place, the argument that industrial management or engineering should be taught in an engineering school or in a college of commerce has little weight. Some prominent engineering educators have pointed to the fact that practically all our eminent executives and industrial engineers have been engineers in training. This to my mind merely points to the fact that commercial training based on economics is so new that comparatively few persons who have taken such a course have yet been out in business long enough to acquire the prominence which many engineers have. It seems to me that there is only one phase of this part of the subject which is of importance. In any university these courses should be taught in only one place, and where both schools are in existence the subject can be taken up as well in one as in the other, and probably the matter of precedence should rule. As my background is largely an economic one, it does, of course, seem to me that the engineering course must be organized with particular care to see that the student does not devote himself too closely to exact mathematical investigation and study, but has ample opportunity to master the ideas based on economics and subsequent courses.

So far as the course content is concerned, I believe that an adequate education is possible in three directions: (1) based almost entirely on economics with practically no engineering, (2) with a fair combination of economics and engineering, and (3) with engineering and very little economics. In any of these a certain amount of broadening subjects should be taken such as English, literature, philosophy, etc. We must remember that the student is not certain to follow the particular line of work for which he is training and that even if he does, he should spend fully half his day at other than business pursuits. It is for this part of his life that we offer him the so-called liberalizing work.

From my point of view the purpose of the university in training the student is to give him (1) the power of analysis or an ability to think and think straight, (2) a certain amount of technique or business sleight of hand which will prepare him to take a definite job when he is through school, and (3), most important, an ideal of what the real accomplishment of his job should represent. We all know that most students when leaving school do not have the opportunity to go to work for some firm famous in the country for its high ideals and accomplishments in management. The student goes where he can get a job, but if we have instilled into him and sold him thoroughly the ideals of scientific management, he will in many cases leave the place where he cannot see any possibility of approximating these ideals and insist on finding ultimately the job which will give him satisfaction from this point of view.

After all it is the ultimate accomplishment of a student that we are concerned to develop. He can go to a trade school and learn to be an efficient foreman. We must give him only enough of this detail to allow him to use it as a stepping stone to a higher position.

A course which is successful should not leave the student with any idea that he is an executive or that he is an industrial engineer. He merely has some background which will make it much easier for him to serve his apprenticeship in industry where, if he sees fit to hew to the line, he will in the course of time become a successful executive or engineer.

Just a word as to field work. We are thoroughly committed both in thought and action to field work as a necessary adjunct to a college course. We do not, however, expect that such work will train the student to be an expert on any one job. It gives him, instead, some knowledge of what the mechanisms of his future job will be and, if the field work is conducted in scientifically operated industries, he will gain a still further assurance that the ideals presented to him in his courses are practical and not visionary.

C. B. Gordy[8]: The developing and strengthening of any profession depends in a large measure upon the development of a class consciousness among the members of that profession. The Taylor Society, the Society of Industrial Engineers and others are doing yeoman service in fostering this feeling among those interested in and practicing in the management field. The teachers are largely responsible for transmitting right management ideals to succeeding generations of students, and the better their work is done the easier it will be for such societies as this one to function. Certainly it will play an important part in the development of management as a profession.

One of the difficulties under which the authors of this paper evidently labored is the confusion of terms regarding the subject under discussion. The title indicates this and it is apparent throughout the paper. The use of the chapter headings in "Management's Handbook" as the working elements of management also shows a lack which the teachers of management ought collectively to help remedy.

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[7] Professor of Industrial Management, College of Commerce and Journalism, The Ohio State University.

[8] Assistant Professor of Mechanical Engineering, University of Michigan.

It seems to me that one cardinal idea should be kept in mind in developing any curriculum, whether in engineering, business administration or management, and that is that the training offered should be broad in scope, if for no other reason than because the majority of the students cannot choose the specific job which they will have after graduation, and their training ought to be such as will permit them to adapt themselves to a variety of conditions.

The thesis of the paper, "the writers . . . unite in believing that one curriculum cannot cover the field adequately," it seems to me, is a perfectly sound proposition. The fields of human endeavor embraced in commerce and industry are so broad and diverse in their requirements that it might logically be expected that different types of training would be necessary. Business, embracing most of the commerce field and much of the industrial field is, with the growth of schools of business administration, rapidly developing into a profession. The peculiar difficulty from the standpoint of this meeting is the fact that "management" is involved in all of these branches of activity. If we accept the thesis that endeavor embraced in the fields of commerce and industry is so broad as to require different types of training, and the authors of this paper admit this, then it seems to follow naturally that the subject of management must at least be considered in any curriculum which aims to train students for either commerce or industry. This is true even though there is no agreement as to the specific elements that make up what we think of when the term management is used.

The question as to whether management shall be taught in the schools of engineering or of business administration does not seem to be of any great importance. The prime requisite is experience on the part of the teacher rather than an engineering or a business administration type of training. However, teachers of individual courses, particularly in business administration courses, cannot escape considering the subject; in a course in finance, for instance, the instructor could hardly cover his subject adequately unless he gives some consideration to ideas of proper financial management.

When we begin to think in terms of the type of training to be given in preparation for industrial engineering, or production engineering or management, the matter becomes somewhat more difficult. The technical aspects of many subjects must be considered apart from their managerial aspects as well as the specific things which the practitioners in these fields may be called upon to do. Considering the latter point it seems to me that the basic elements should be engineering rather than business administration, and that training in management, when considered separately, should be superimposed on this foundation. By this I do not mean that the engineer is the only and anointed one to be permitted to practice in the two fields mentioned above, but that in view of the increasing complexity of industry his training will enable him to grasp more quickly than a man trained in business administration the technical aspects of daily production problems, in consequence of which his advancement will be the more rapid in this field.

If we approached the subject entirely from the business administration angle we should be training production clerks; at least the student would be under a considerable handicap, out of which he would have to extract himself unaided. I do not believe that a few abbreviated courses in engineering would help materially. The matter of prerequisites would prevent anything but a bare smattering and a smattering is frequently worse than nothing.

The superstructure of management can be taught in either school. At Michigan instruction in the managerial aspects of finance, accounting, marketing, statistics and labor are of course taught in the School of Business Administration, and these subjects are all included in our 5 year curriculum in Industrial Engineering. Most of the other items mentioned in table one of the paper are taught by a group of men handling both engineering and business students. It happens that these men are graduates of business administration schools.

Hudson B. Hastings[9]: It seems to me the chief value of the paper by Professors Roe and Burleigh is in calling attention to the fact that the educational institutions of this country are today offering two very different types of courses as a foundation for an industrial career which it is anticipated may lead to the top of the executive ladder; and by "industry"

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[9] Professor of Administrative Engineering, Sheffield Scientific School, Yale University.

I take it we mean manufacturing enterprises as contrasted with trade, commerce, finance, insurance, etc. The mere statement of this situation raises the question of the relative value of the two types of courses for the purpose intended.

It may be said that in nearly all institutions the type developed depended upon the type of the institution establishing the course (*i.e.*, academic or engineering) and not upon an attempt to evaluate the relative merits of the two types.

In our present discussion of the subject we are naturally inclined to seek for reasons to justify the type of course with which we happen to be connected, and while this may provide an interesting debate it is not a scientific approach to the problem. It is useless to quote examples of successful careers of those taking one or the other of the two types of courses for we can also find examples of notable achievements in industry with other types of preparation in institutions of higher learning, and innumerable cases where successful individuals have had no formal educational training beyond the elementary grades.

There is one phase of educational training, however, which the authors unite in endorsing and which is supported by a considerable body of experience. This is the superior value of the cooperative type of training whereby the students spend alternate periods of approximately the same length in industry and the classroom.

For the development of the best curriculum and the planning of the content of the courses we have virtually nothing to guide us outside of reasoned considerations, and it is clearly in the interest of efficient management of both educational and industrial enterprises that we should attack the problem from a scientific standpoint.

In this situation it would seem particularly appropriate for the Taylor Society to become one of the leading agencies in the study of the whole problem of education for industrial management.

If the members of this society who are directing industrial enterprises will individually undertake to employ graduates from different types of courses, who otherwise seem to have equal potential capacity for industrial leadership, we will have available, in the course of time, a body of data which will enable us to give something approaching a scientific answer to the problem presented by the paper under discussion. Comparisons, such as are now not infrequently made, between a graduate from one type of course in one company with a graduate from another type of course in another company are of practically no value.

Somewhat more difficult for scientific analysis are other phases of education for industrial leadership but they constitute, as a whole, a problem of major importance and worthy of our best efforts in working toward an adequate solution.

J. O. Keller[10]: Under the three methods suggested for setting up a college curriculum, no mention is made of consultation with alumni. This would most likely be classified under heading two, namely, opinions of industrial leaders. Our Dean last year sent out a questionnaire to all our engineering alumni; I should like to give you some data taken from the replies of the industrial engineering alumni.

The course in Industrial Engineering at Pennsylvania State College was established in 1908 by Colonel Hugo Diemer, but we did not graduate anyone until the year 1910. Sixty-four replies to the Dean's Christmas Letter were received from men who graduated in Industrial Engineering, three from men graduated before 1914. Of these 64, 48 are following industrial engineering, 12 mechanical engineering, 2 civil engineering, and 2 are in non-engineering pursuits.

I give below their answers to the questions concerning the value of the various courses. Only those subjects which received a goodly number of votes are included.

I. What subject or line of study has proved of the greatest (least) professional value?

Greatest Value	
Industrial Engineering Subjects	38
Mathematics	11
Mechanics	4
English	4
Least Value	
Language	23
Chemistry	6
Mathematics	5
Machine Design	5
Industrial Engineering Subjects	3

II. What subject has been of greatest (least) cultural value?

Greatest Value	
Economics	31
Literature	17
History	10
English	5
Language	5
Psychology	5

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[10] Head, Industrial Engineering Department, Pennsylvania State College.

Least Value

Language	28
History	6
Economics	5
Literature	3

III. What subject contributed most (least) to your success?

Greatest Contribution

Technical subjects of our own course	31
Mechanics	8
Miscellaneous technical subjects of other courses	5
Mathematics	4
Economics	3
Heat Engines	3
Psychology	2
Electrical Engineering	2
Machine Design	2

Least Contribution

Machine Design	12
Heat Engines	6
Language	6
Technical subjects of other courses	5
Technical subjects of our own courses	4
Chemistry	3
Electrical Engineering	3
Mathematics	2
Mechanics	1

I do not pretend to know the quantity and quality of engineering subjects most needed by students majoring in the commerce field, but I do have decided opinions as to what the industrial engineering student should take to prepare him for an executive position in the technical side of industry.

In the first place, he should have a thorough training in those subjects which are classified as engineering fundamentals. In addition, the engineering student cannot receive too much English. I do not mean commercial English, business English, or so-called engineering English, but simply good courses in ordinary English composition and literature. A man well grounded in English can easily adapt himself to letter writing. But he must have an appreciation of what is good, clear, concise English. Technical courses should of course be included which have to do with the engineering problems of industry, following substantially the classification as given by Professor Roe and including Industrial Organization and Management, a thorough course covering purchasing, stores, materials handling, wage systems, and so forth.

Who shall teach this course in organization and management depends not so much on what we think, as upon who started to teach it first in any particular college. Since the industrial engineering course was established at Penn State prior to our commerce and finance course, we handle this work here. I think that the engineers in general are to blame for not handling such courses in more institutions than they do, because of their early antagonism to such work. Now that they wish to handle such courses, they must suffer for their lack of foresight in general.

Of the purely commerce subjects, I believe fundamental courses are essential in economics, both elementary and advanced; psychology; elementary and advanced accounting including cost analysis; and industrial relations and personnel administration. There are other excellent commerce courses covering such subjects as statistics, selling, finance, and commercial law, but beyond this it does not seem possible to crowd more into the four years. I am not altogether in favor of a five year course, although there are some advantages, I admit. The most we can hope to do is to draw out the student, teach him to think for himself, so that after graduation he can continue his studies for himself.

I am greatly in favor of the problem or project method for some courses, and as much cooperative work as it is possible to have under the conditions governing each college. Penn State is so situated that we must obtain our cooperation through summer work requirements. I believe that this could be better regulated than it now is.

As mentioned in the paper under discussion, our colleges do not pretend to turn out finished executives, and if we can turn out men of good character, well grounded in fundamentals of their particular field, who are willing to learn after they have been graduated, we have about accomplished the ultimate.

R. H. Lansburgh[11]: It should be emphasized that preparation for manufacturing industry can be adequately given in both the engineering school and the school of commerce. Students who are mechanically inclined at an early age are likely to select the engineering school. However, many students who ultimately go into manufacturing industry and win places of leadership therein are likely to be found in the school of commerce. In many cases these students will have selected the school of commerce because they did not feel that they were mechanically inclined, or because their preparatory training was such as to preclude admission to some of the engineering schools.

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[11] Professor of Industry, Wharton School of Finance and Commerce, University of Pennsylvania; now Secretary of Labor and Industry, Commonwealth of Pennsylvania.

The solution of this condition lies in the development of courses within the engineering schools which shall be specially devised for commerce school students who are interested in engineering, and the development in the commerce schools of courses which are specially devised for engineering school students interested in management and administration. The restrictions of time and the lack of inclination of most students to spend more than four years in college make it highly desirable to devise these special courses rather than to attempt to have students in one school take the regular routine of courses in the other school before they can secure the advanced courses which they may desire. The special courses both in the Engineering School and in the Wharton School of Finance and Commerce, which have recently been developed by the University of Pennsylvania and other institutions, indicate some of the possible developments along these lines. Of course, experience will modify the particular courses and their content from time to time. However, the idea of a special course in one school for students of the other school seems to be inherently right.

In considering a curriculum for training for management of manufacturing industries, it is essential that we keep in mind the large numbers of manufacturing industries in which metal working plays little or no part. In textiles, paper, shoes and food manufacture, many of the courses which are outlined in the curriculum laid down in the paper under discussion would not be valuable, although substitutions could be made in some cases from the field of chemistry and chemical engineering. Nevertheless, a full consideration will promptly indicate that the basis of training for such manufacturing industries may, perhaps, better be the commerce course with engineering options rather that the engineering course. And when it is further considered that students, as they enter college, have knowledge of their future vocation in but a small percentage of cases it becomes even more important that we should train broadly for the field of manufacturing rather than for any particular type of manufacturing. Even though a student may be interested in manufacture, and even though he may feel definitely that he is going into a particular branch of manufacturing industry, we all know that (even should he stay within the fields of manufacturing) the particular industry into which he enters will very likely depend on specific opportunities at the time of his graduation.

P. F. Walker[12]: Messrs. Roe and Burleigh have given in their paper an interesting survey of what is coming to be a real education problem. Business and managerial training has been approached from two different angles, and it is becoming necessary to decide questions as to scope and character of curricula appropriate to two distinct sets of conditions. I have found that university administrative officials are looking in these days for effectiveness in organization of the work that is to be offered, and there is need for defining the divisions of the field which shall be assigned to industrial engineering on the one hand and the production branches of the schools of commerce and business on the other.

There is one criticism of the paper which I propose to make at the outset. The two proposed curricula are too much alike. The differences are not sufficiently definite to indicate clearly defined purposes for these two branches of our educational institutions. It in my belief that our industrial engineers should be primarily engineers, fitted to take positions which our mechanical engineers take regularly. On the other hand the graduates from our schools of commerce should be ready to enter upon these positions which they naturally take, with good and sufficient foundation for that work. This does not mean that there should be no interchange. In fact, my thought is based strictly upon the proposition that each curriculum should contain a sufficient amount of the work in those lines which are distinctively of the other sort so that the graduate from each may have a fairly intelligent understanding of the problems which are inherent in the other. But the primary objective in each branch of work should be clearly of the nature appropriate to the one class of work or the other.

The line of approach of the engineer to administrative and managerial positions is clearly defined. Graduates of our schools of engineering, men who have taken the regulation courses, have been going in large numbers into positions of this character. Extensive studies of the records of alumni in various institutions have revealed on the average that nearly two-thirds of all those who remain in those occupations which are related to industry and construction are in positions of administrative character. The schools differ in this respect. In the case of one prominent school, the proportion engaged in this class of work runs almost constantly at two-thirds after the men have been out of school five years. In another institution it happens for some unknown reason that the proportion is only one-third. Some years ago I made a study which covered the records of 1,000 mechanical engineering graduates and found the number in positions of administrative authority to be almost exactly one-half. This means that the definite approach to positions which have relationship to the business and administrative sides of industry is well defined for the regular engineering graduate.

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[12] Dean, School of Engineering, The University of Kansas.

It should be noted also that industries at the present time are looking definitely for engineering graduates for men who are to advance to administrative positions. I frequently place graduates with the Portland Cement manufacturers. Managers of these plants tell me that it is their intent to recruit their superintending and managing staff from these engineers. The Corn Products people tell me that they have a definite policy of advancing no one to the position of plant superintendent who did not come through the ranks of the engineering staff where they would become thoroughly acquainted with the heat and power phases of operation. Machinery sales work is being manned almost entirely from the ranks of engineers. While sales work is not in itself managerial, it represents an activity which would be classed among the business subjects. I have personal knowledge of many of these men who go directly into sales work, and who have advanced into the managership of sales. These illustrations are given merely to show that men with engineering training have found their way into these branches of work, and that industry has learned to look to the engineers for this service.

Now my point in criticizing the industrial engineering curriculum which has been presented is that we should not discount the advantage which has already been established. The line of advance has been definitely established, and we do not want to start turning out men, designated as engineers of any class or type, who are not fully equipped to fill positions where they will be expected to perform work of an engineering character. We cannot afford to give up the advantage. It is entirely possible to give the men this training which is basically engineering and at the same time give the men whose inclinations lead them in that direction a fair amount of work which bears more directly upon the economic and business side. It is somewhat difficult to do this in a crowded curriculum of a four-year course of study, but some of us are doing it. It means replacing some of the more specialized courses with other courses given in the school of business. In my own school, out of 140 hours required for graduation, the man in industrial engineering are given about 20 hours in economics and business and 11 hours in industrial engineering subjects. These men are given all the basic courses in mathematics, physical science, and engineering, just as are the mechanical engineers. I believe firmly that they need this training, which includes the calculus, so that they may take their places in industry alongside of other engineers.

It is my belief that graduates from the school of business and commerce also have their direct lines of approach. The training as outlined in the paper for the school of commerce appears to recognize that fact, and it appears to me that it carries out for that group the thought which I have expressed in connection with the engineering branch. I am not so familiar with conditions in that general field, and have not had opportunity to study this paper closely for the purpose of determining whether or not the suggestion made is adequate to meet the principle which I have indicated. It is my belief, however, that it does meet that thought, while I fear that our engineering friends in their zeal to lead engineers into the administrative path have gone too far away from the engineering curriculum. There is no need for the engineering schools and the business schools to merge. While the product of these schools may sometimes reach over and overlap in the field of business, nevertheless each group has its own function and its own line of approach. Some men fall more naturally into one while others fall into the other. Their approaches to the economic problems of business are along different lines, and if they have chosen their course of study properly in the beginning they will be in the best position to advance if their course of study has been such as to qualify them for the work which first comes to their hand, while giving them in all cases the larger vision which will stimulate growth through which will come ability to deal with the larger problems in due season. Let us recognize this difference and not permit the two curricula to become too much alike.

658.808

The Technique of Market Analysis[1]

Examples of Analysis by Questionnaire, by Investigation, and by Statistics of Sales, Salesmen and Prospects

By ARTHUR LIVINGSTON

Manager of Research, McKinney, Marsh & Cushing, Detroit, Mich.

THERE is probably no question in your minds as to what is meant by the term "market analysis." One way of expressing this activity is to say that a market analysis is a study of the sales possibilities of a given product for a given concern. In addition to uncovering the possibilities, the analysis should also suggest the selling machinery needed to secure the amount of business shown possible.

The need for a market study becomes evident in a business. If the business is standing still, it may resort to a market analysis for a remedy. A market study should reveal where and how more orders might be secured. If a business is losing money, a market analysis may uncover expensive and unnecessary sales practices. If a going business needs a greater volume of orders, a market analysis can point to the source very clearly. It will also give new selling arguments, new and better advertising ideas; it will suggest changes in design of a product, new ways of wrapping and shipping; it will outline merchandising plans not before used. You can see that the function of a study of this kind is very broad.

There are three ways of approaching a market analysis: by questionnaire, by personal investigation, and by the use of carefully chosen statistics.

First, consider the questionnaire method. A carefully selected list of questions is prepared and printed on a convenient form and sent to a selected list of individuals for reply. This is sometimes done with a view of determining the attitude of the general public toward the product. It may be that the concern would like to know the major criticisms directed against the product. The concern may like to know what effect competing articles are having in its own market. They may wonder what methods competition is using. Another important item is to learn what the probable sale is of a new product. These can all be made known by sending out printed questionnaires in large enough volume so that a sufficient number of replies may be secured.

One questionnaire revealed that a certain make of automobile was highly regarded in every feature except one; that was quality of the painting. The owners of this car were very frank in informing the manufacturer what they thought of the finish. Beside this criticism, however, the manufacturer secured fine endorsements and favorable commendation as well.

Another questionnaire gave the manufacturer hundreds of reasons why he could say he was giving the greatest value per dollar. Each reason was signed with a name.

The book "America's Big Small Town Market" is the result of a questionnaire. It has over 300 pages of figures. The Household Magazine, a publication reaching over a million and a half people living in towns of 2500 and under, printed a questionnaire on one of its pages and asked subscribers to fill it in and send it to them. Over 31,000 readers tore out the questionnaire and answered it.

What is the object in having this kind of a questionnaire filled in by readers of a magazine? Publishers endeavor to show to probable advertisers in their columns the markets they have among their subscribers. One of the best ways in which they can enlist the interest of an advertiser is to show him something of his market among the readers of the magazine. The figures in this book are astounding and do show the great possibilities for sales of all kinds of articles.

The interesting point about this questionnaire is that 31,461 subscribers to this magazine tore the questionnaire form out of the magazine and filled it in and returned it to the publisher. There were over 100 questions to be answered, all dealing with the living conditions of the signee. I will give just one illustration which will show you how successfully the publisher has uncovered tremendous markets for all kinds of products among his readers. Two of the questions he asked were: "'Do you have running water in your home?" and: "Do you have a fully equipped bathroom?" Forty-three per cent of those answering said they had running water, while only 27 per cent reported fully equipped bathrooms. An honest conclusion can be drawn, namely, that the difference between 43 per cent and 27 per cent or 16 per cent of the total subscribers to this magazine are prospects for fully equipped bathrooms. Expressed in figures this amounts to 266,194 prospects.

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[1] Paper presented at a meeting of the Taylor Society, New York, December 6, 1924.

This questionnaire reveals a wide market among the families in small towns for many different products. For example, there is a market among their subscribers for 630,000 oil stoves and 175,000 electric vacuum sweepers.

The second method of approaching the analysis of a market is through personal investigation. A crew of men is sent out to gather specific items of information such as will best meet the needs of the business at that time. They go out with a carefully studied approach and a list of questions which they ask as skilfully as they know how.

In this way the concern arrives at the personal opinions of its prospective buyers; it learns which are favorable and which are not; it can classify its prospects according to their requirements. Personal investigation accomplishes results similar to those gained by the questionnaire method, but is a much more expensive proceeding and is used only where the number of supplies sought is not excessive.

One company wanted fifty of the largest concerns in Detroit called on. The information they sought could not be secured through their own salesmen. These concerns would not have given any salesman the confidential information which was being asked for. An outside firm made the survey and only a few concerns refused to give out any information. This manufacturer's chief ambition was to learn what those fifty leading and representative concerns thought of competing machines, how many of them they had purchased, where they were using them and why they had purchased them. You can see that data such as this coming into the home office may cause the executives to change radically some of their fundamental practices along most any administrative line.

A few experimental calls were made for a typewriter manufacturer to learn what the situation was in a certain city. The aim was to secure ammunition that might be used as selling arguments and advertising copy. One of these reports follows; you can determine how well the end sought was accomplished.

Report of Call Made on The Detroit Business University

Saw Mr. L. W. Tremain, Principal.

They use about 100 machines in the school and rent out about 200 others. Most of these machines are Remwoods.[2]

Mr. Tremain is about the most enthusiastic Remwood booster I have run across. He says, "There is nothing like the Remwood." Operators on many occasions prefer to use old Remwoods rather than new typewriters of other makes.

First he spoke of its strength and durability. In a school like his, machines receive all kinds of treatment from inexperienced and new operators but he claims that even with this almost mistreatment, the Remwoods still do not break down or give trouble, as compared with other machines. Because of a simpler design, with fewer parts, most anyone can make the minor repairs. "It is easy to get into," and even girls sometimes make their own adjustments.

He said: "It is a Ford for durability, wear and dependability." When it is necessary to typewrite, the machine is ready for use. The bolts and nuts do not become loose and the mechanism is not out of adjustment just when you want to use the machine.

In speaking of a competitive make and the fact that it had what was called a dustproof panel, Mr. Tremain explained that when the dust does get in, the dust panels make it impossible to take it out. He spoke of the fluff which comes off the paper and seeps into the base of the machine through the opening where the type hits the paper. With the Remwood this dust is easily removed. With the others it is a difficult operation. Mr. Tremain mentioned that he supposed they had more trouble with his 20 competitive makes than with 100 Remwoods.

The big selling feature is the speed of the machine. He claims that when a fast operator uses the other makes, the type piles up. No matter how fast they operate the Remwood, they do not have this trouble. Moreover, it seems that girls like to have a speedy machine, even though they are not fast operators themselves, like the automobile driver who likes to know that his car can travel 70 miles an hour, even though the law forbids him to go over 35.

Mr. Tremain thought that advertising carried in The Gregg Writer, which we find has a circulation of about 58,000, would pay out.

Let us refer to the definition we have of market analysis. A market analysis is a study of the sales possibilities of a given product for a given concern. Having determined this, it should also indicate the selling machinery that is necessary to secure this maximum amount of business. There may or may not be any limitations to the questionnaire and personal investigation methods, but where there are limitations, they are in satisfying completely the second portion of our definition. The greatest thing that can be said about a market analysis is that it gives you the answer, that it forces upon you irresistibly the action which will bring about increased sales. That can be done absolutely through our third method and that is, through the use of carefully chosen statistics.

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[2] I have changed the name of the typewriter manufacturer for obvious reasons.

In order to understand this method, we will have to reason it out from an altogether different angle. Let us get a mutual understanding of what we mean by "the market." When the term is mentioned we immediately think of the entire United States. Instead of doing that in this instance, let us think of one unit of territory, knowing that what we may learn about it will serve us in learning about the whole country.

In this territory you have a salesman. In this territory you have prospective buyers. The prospects—good, bad and indifferent; good pay and poor pay; big buyers and small buyers; slow and fast; intelligent and seemingly non-intelligent—constitute your market. Here they are, a great assembly of conundrums—the "will-buys" and the "won't-buys"; the progressive and the reactionary; the conservatives and the reservatives.

Facing this regiment of unbelievers in this unit of territory is a salesman, the average salesman—sometimes up, sometimes down; sometimes enthusiastic, sometimes pepless; a man today, a child tomorrow; energetic this morning, dejected this afternoon; working hard this week, taking things easy next. Consistency cannot be attributed to him.

The point I want to make is this: there are two sides to your market problem—the prospect's side and the salesman's side—and you must study both to make a true market analysis. Suppose you were going to plow a field, would you say, after noting the number of acres and examining the soil, that you could plow the field in eight hours? No, you'd take into consideration the kind of motive power you had available. If you had a Fordson tractor you would make one estimate; if you had horses, you'd specify another amount of time. *Your* market varies with the power of *your* selling structure.

This being the case, let us think a little about your salesman. What are the significant things that he is doing? From his activities what can you deduce about your market?

We can uncover many fundamental facts about a business by keeping a few essential records, such as:

Sales by salesmen
Sales by counties, or cities
Sales by styles, or classes of merchandise
Sales by lines of business sold, or kinds or classifications of buyers.

These are what you need most. Each one will give you the status of a major activity of your business. The scope of these may be amplified, for instance—sales by salesmen may be extended to show sales by styles by salesmen, or sales by lines of business by salesmen. Showing not only what a man sells, but what classes of buyers he is selling to and which of your products he is selling to these buyers. Sales by lines of business may be extended to show sales by styles by lines of business which will give you the kinds of products each type of buyer you have buys.

These records are to the sales department what production charts and figures are to the factory. Each salesman is a part of the machinery which is operating to produce sales. He should be watched with the same degree of watchfulness that the factory superintendent gives to a piece of productive machinery.

The efficiency of all your salesmen is of great importance to you. You may think that a salesman is worth what he brings in in orders. This is true of a particular salesman; but, when you have a number of men, you must have some sense of what the average man is able to do.

You have good salesmen and you have poor salesmen. You wish, together with all other manufacturers, for more super-salesmen. More of them would, of course, increase your business, but the competition for good salesmen is keen and the supply none too great. It becomes necessary to deal with a situation as it stands, and when you base your sales policies on what the average salesman can do, as disclosed by these figures, the fact that you haven't all the super-salesmen in the country will not stand in your way to increased business.

Not many concerns keep such records as these. One reason is that they haven't any ideal to match these performances against. In the factory, the superintendent knows what his machinery is capable of and compares his output with what he knows to be maximum production. When he runs behind, his charts tell him which particular unit needs attention.

The absence of an ideal figure to check against is what has caused many executives to say that statistics are an unnecessary expense. That ideal figure, gentlemen, is Quota—quota by salesmen; quota by counties; quota by styles, and quota by lines of business.

Now that we are headed toward quota, have we forgotten about market analysis? I think not. You remember that, when we drew the first lines of this market picture, we said it had two sides—the salesman's side and the prospect's side. We have talked about the salesman's side; now we are going to think about the prospect. As incorrigible as we like to think he is, we have to give him space. We need him—need him in our business, and we need to know some very important things about him.

How many prospective buyers have you in Kent County, Michigan?

I can liken the number of prospects a salesman has to the number of chances a player has playing a game of baseball. We figure the player's skill by the number of chances he accepts. If he fumbles the ball or lets it run through his legs—that's one against him. Some balls, like the salesman's prospects, are so far away that he doesn't even try for them. Some are too fast, "nasty" ones and he doesn't go near them; some he misjudges and they go over his head.

After the game is over, the manager figures the per cent of efficiency of his team—so many chances, so many accepted, so much per cent. How can you tell what speed your company is fielding at unless you know how many chances you have to do business, how many you are muffing, and how many you accept?

If you do not know how many prospects each salesman has, you may be making *this* mistake. On the east side of New York, within the boundaries of one salesman's territory, it was found through analysis, there were 5000 possible buyers of the company's product—good, bad, and indifferent. If a salesman is really selling his product, he does not average more than about six calls per day. Therefore, if a salesman is allowed 1200 prospects when business is normal, he has all he can handle; and this man had 5000. After this analysis was made, four men were placed in this territory and it supported them.

There are over 20,000 business enterprises above 110th Street in New York City. When this startling fact was made known the number of men working the territory for one firm was increased from three to six and the business doubled.

It took more than merely knowing the number of prospects to warrant taking such decisive action. Some of these prospects were manufacturers; some wholesalers; some retailers. A wholesaler represents a different type and class of buyer than a manufacturer or retailer. They bought in differing quantities, so each was of a different value to the concern. Worked out on a mathematical basis, a wholesaler rated $10,000 and over was valued at $90; a retailer rated over $10,000 was valued at $18; and a manufacturer with a rating over $10,000 was worth $32. Now this concern hasn't any product which sells at $90.00 or $18.00 or $32.00. Their orders average around $300. These values of $90, $18, and $32 are what each prospect represents of potential value with all of them, good, bad and indifferent, thrown into the calculation. If in a county there are 100 wholesalers and the value per wholesaler is $90, then the salesman handling that county must bring in 100 x $90 or $9,000 worth of business. If another salesman has nothing but retailers to work on and has 1200 of them, at $18 each, his annual business should run $21,600. A county which has 1500 manufacturers, at $32 each, represents a quota of $48,000 and it will take more than one man to get it.

How are these values secured? By combining the information we have on both sides of our market picture. By taking these figures on selling performance and relating them to the number of prospects we have.

Table 1 shown herewith illustrates how the statistical data may be tabulated to arrive at values per prospect. In this instance the concern sold to all types of business enterprises. They classified their sales into eight major groups: banks, financial concerns, government offices, public service institutions, manufacturers, wholesalers, retailers and general concerns. For years they have kept a very careful record of their sales to each of these major groups. The chart shows four years' sales. You can see that during these years there was a very substantial increase. The percentage figures on this chart are the most important. Look them over carefully. Notice that during the four years the percentage of the total business of the company which was sold to banks did not vary over 2½ per cent. The first year shows they sold 33.3 per cent of their business to banks; in the second year, 31.2 per cent; in the third year, 30.9 per cent; in the fourth year, 30.9 per cent. It is rather amazing to find one part of one's market taking such a consistently close percentage of its sales. This condition is not by any means peculiar to this concern, however. Similar calculations for other concerns

Table 1—Four Years' Sales Distributed by Lines of Business Sold

	Year 1		Year 2		Year 3		Year 4		Average
Lines of Business Sold	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent	Per Cent
Banks	$235,454	33.3	$265,848	31.2	$364,976	30.9	$390,109	30.9	31.4
Financial Concerns ..	27,151	3.8	36,430	4.3	37,371	3.2	43,399	3.4	3.5
Government Offices..	28,946	4.2	34,958	4.1	40,233	3.4	37,066	2.9	3.5
Pub. Ser. Institutions.	31,251	4.4	46,406	5.4	51,584	4.4	56,124	4.5	4.5
Manufacturers	76,045	10.8	123,870	14.5	176,513	15.0	188,755	15.0	14.0
Wholesalers	54,858	7.8	90,900	10.7	138,049	11.6	109,934	8.7	10.0
Retailers	189,621	26.9	184,570	21.7	287,825	24.4	329,892	26.2	25.2
General Concerns....	62,177	8.8	69,176	8.1	83,920	7.1	106,367	8.4	8.0
Total Sales	705,503	100.	852,144	100.	1,180,483	100.	1,261,646	100.	100.

have revealed the same tendency, and I am sure you will find it true in similar form in your business.

It seems that the business of concerns flows in definite channels and when these facts are discovered many invaluable conclusions can be reached.

Turning to the chart again, we notice that the business to wholesalers does not vary from the composite average of 10 per cent more than 2 per cent. Just think of a concern whose business runs into the billions every year securing a certain definite percentage of that business, no matter what the total may be, from a particular group of their prospects, as is illustrated by this wholesaler observation. And yet I want to remind you that similar conditions are true of your business. This means that no matter what we may set as a goal, or quota for this concern to attain in the way of business during the coming year, if we allot 10 per cent of that business to wholesalers, we will come within 2 per cent of being absolutely correct. If at the beginning of 1925 we set as a goal five millions of dollars to be secured by this company, we can correctly forecast that 10 per cent of this amount, or five hundred thousand dollars, will come from wholesalers. At the end of 1925 after the entire organization, both at the headquarters office and at the field offices, have all done their best in advertising and in selling, no matter what the total business may be, approximately 10 per cent of it will have been sold to wholesalers.

Now, therefore, if there are 5,555 wholesalers in the entire United States whom this concern considers as being in their market, this $500,000 must naturally come from them and, if from among them all the company is to secure $500,000, each one represents a potential value of $90. This, of course, is secured by dividing $500,000 by 5,555 wholesalers.

What we have done with the wholesalers group can be duplicated in any one of the other eight groups, because you can see that there is the same regularity obtaining among them.

The composite performance among the manufacturers is 14 per cent. You can see that during two of the years the company's business was within 1 per cent of this figure. In another year it was within ½ per cent. In the first year shown on the chart we have the greatest variance, which is 3.2 per cent.

We will assume that there are 21,870 manufacturers in the United States who are considered prospects by this company. Having previously determined that 14 per cent of whatever business they may hope to attain during the coming year would come from these manufacturers, by dividing the total business to come from manufacturers, which in this case would be 14 per cent of five million or $700,000, the result would give us the value per manufacturer, or $32.

A similar calculation is shown herewith where we divide the amount of business to come from retailers, or $1,250,000, by the number of retailers in the United States to whom this company can sell its product, giving us the $18 value per retailer.

$$\frac{\$5{,}000{,}000. \quad \text{x} \quad 10 \text{ per cent}}{\text{Wholesalers in the U. S.}} = \frac{\$500{,}000.}{5{,}555} = \$90.$$

$$\frac{\$5{,}000{,}000. \quad \text{x} \quad 14 \text{ per cent}}{\text{Manufacturers in the U. S.}} = \frac{\$700{,}000.}{21{,}870} = \$32.$$

$$\frac{\$5{,}000{,}000. \quad \text{x} \quad 25 \text{ per cent}}{\text{Retailers in the U. S.}} = \frac{\$1{,}250{,}000.}{69{,}400} = \$18.$$

With our values per prospect we can work out two of the ideal figures we need; quotas by salesmen and quotas by counties or cities.

I am sorry I haven't more specific data showing the significance of these records and the benefits accruing to you by keeping them. But with a system of record keeping such as is outlined here and a tabulation showing the number of prospects you have in every unit of territory, you are prepared not only to make a market study but to advance to the next step, namely, determining the selling organization you need to realize on your possibilities.

When you start your market analysis, whether it be along questionnaire, personal investigation or statistical methods, see to it that you gain from it information which will cause you to reshape your selling organization and constructively change your policies. Try not to limit it to a temporary aim or objective. Let it decide what your sales plans must be and I am sure you will not go very far astray.

Discussion

Paul T. Cherington[3]: Markets are groups of individual buyers and hence represent aggregations of their individual nature.

Any market study for any product, of voluntary use and sold for an appreciable consumer price, involves both the factors of *ability* to buy and *willingness* to buy. By the law of averages it may, and frequently does, happen that the quantitative figures for numbers of people may give a satisfactory guide to the qualitative factors represented by inclination to buy. This does not alter the fact that any market analysis to be complete should cover both the qualitative, as well as the quantitative, factors.

The main thought I want to add to Mr. Livingston's discussion is this one that market studies, in order to be of most value, must consider these qualitative elements. Brute force in selling will accomplish much, as truly as it will in any other form of effort. But as sales effort becomes less dependent on brow-beating a customer and more dependent on serving him by virtue of a real knowledge of him and of the motives that control his buying activities, the greater will be its value to both buyer and seller.

It is indispensable of course, to know and assemble all the essential facts about the number, geographic distribution and economic status of customers or "prospects." But the point I want to make clear is that these have to do only with *ability* to buy. Unless these facts are supplemented by knowledge of resistances, susceptibilities, habits, prejudices, customs, buying motives and the utilization of these facts which have to do with inclination to buy, only part of the truth about the market is known. With these factors analyzed, marketing is largely a matter of skill. With quantitative data only it must be largely a matter of brute force.

W. A. McDermid[4]: To an audience like the Taylor Society it is unnecessary to emphasize unduly the hidden significance of Mr. Livingston's presentation of the subject of market analysis. Its scope, as to purpose, method and use is so great that the utmost compression is necessary.

For example he refers incidentally and in a single phrase, to the use of analysis to give "new and better advertising ideas." Within the past month there has been published a statement by a prominent concern showing how an analysis reconstructed their entire advertising program and it took nearly 5,000 words to portray the seriousness of their problem, the difficulties involved, the existing waste and inefficiency, and the manner in which the analysis was applied to the solution of the problem. And this was only incidental, in turn, to the effect on their engineering, their production, and their merchandising.

When one seriously considers the far-reaching possibilities of intelligent market analysis, it is easy to understand, first, why there has been such a marked and growing interest in it; second, why so many concerns are either afraid of it or sceptical about it; and third, why there is such a startling spread between those who have used it with conspicuous success, and those at the other end of the scale who refuse to concede that it can possibly benefit them.

Mr. Livingston has touched only briefly on one of the basic problems of successful research—the need for either questionnaires or reporters that really get the facts. The number of so-called surveys, in unskilled or biased hands, which give utterly faulty results and prejudice the entire method, is simply appalling. The most encouraging thing in the whole situation is that there are at least a few people in the field who combine with a knowledge of merchandising a scientific regard for fact, an ability either to draft intelligent, non-leading questions or drill a reporter into how to question and how to report, and finally, an ability to tabulate results and make sound deductions. In the hands of these few, market research is assuming the place which it deserves in enterprise.

To one of my personal bias, the outstanding value of the kind of research that Mr. Livingston has described, and more especially the statistical analysis of values by prospects or business enterprises, lies in its application to the problem of sales control.

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[3] J. Walter Thompson Company, New York.

[4] The Hoover Company, North Canton, Ohio.

He has a phrase that ought to be framed, in large letters, in the office of every sales executive in the country:

"Your market varies with the power of your selling structure."

About that thought, in all its implications, a volume—indeed, several volumes—could be written. It embraces the entire theory and practice of advanced sales management.

Mr. Livingston has clearly outlined the high spots in the process of removing sales control from the field of personal prejudice, guess, hunch, argument and rule of thumb. His formula is exact, and while in operation it is not as simple as it sounds (nor does he imply that it is an easy task), it is a formula as applicable to the small, personally-led sales unit as it is to the largest, impersonally directed and highly organized sales machine.

Mr. Livingston, by the limitation of his subject, could not enlarge on the specific application of the methods he describes, but the principles are all included in his paper:

1. The breaking of the territory into units and their individual measurement as to market potential.
2. The parallel breaking down of the sales operation into its basic form—a species of time study.
3. The setting up of averages—both as to territory potential and sales operating results.
4. The creation of an ideal standard operation and a standard sales unit.
5. The multiplication of this unit as many times as is necessary to accomplish the task.

With this as a basis, it is clear why Mr. Livingston criticizes by inference the search for the "star" salesman, and why he knows that under this plan of control the good man becomes better, and the poor man is pulled up to average.

Since man-building is a primary duty of a sales executive, it is clear that only by some such means as this can he take the good, the average and the mediocre, and, while improving them as individuals, weld them into an effective selling structure.

No less important is the deduction to be drawn from his description of quota making. Quota has suffered from the enthusiasm of its friends. It has been hailed as a panacea for sales troubles, and has frequently added to them. Unless it is scientific—unless it is based on accurate knowledge—unless it is acceptable on its merits to the sales force and to management alike, it can do and is daily doing far more harm than good.

The company from which Mr. Livingston has drawn the specific illustration he used has publicly testified to the fact that scientific quota making of this kind literally saved their business. The contrast between this and the crimes committed under the name of quota is in itself an endorsement of the very great value of Mr. Livingston's presentation.

News of the Sections

New England

The New England Section planned its meetings for the entire year on the general subject of "Distribution" and announced them in an attractive folder.

The following have been held according to schedule:

November 6, *Boston*—"Tackling the Rising Cost of Distribution." Speakers: E. A. Filene, President, Wm. Filene's Sons Company, and B. A. Franklin, Vice-President, Strathmore Paper Co., Mittineague, Chairman New England Section of the Taylor Society.

January 8, *Springfield*—"Interaction of Sales and Production." Speakers: Edwin Krause, President, The Corporation for Inventory Conversion, Springfield, on "The Relation of Sales and Production to Unbalanced Inventories"; John H. Dowd, Billings and Spencer Company, Hartford, Conn., on "Responsibility for Product Specifications"; E. H. Davis, Scovill Manufacturing Company, Waterbury, Conn., on "Should the Sales Department or the Production Department have the Master Voice?"

February 5, *Boston*—"Are the Following Tendencies Lessening the Importance of the Sales Force: 1, Direct Selling and the Cooperative Movement; 2, Advertising as a Distribution Factor; 3, Manufacturers' Retail Branches"? Speakers: President Charles F. Adams, John T. Connor Co.; Major P. F. O'Keefe, O'Keefe Advertising Agency; Harry Morse, The Florence Stove Company. A. L. Filene, who presided at the meeting, gave a brief resume of the recent Washington conference on distribution.

Two other meetings are planned—one to be held in Worcester in March on the subject, "Scientific Approach to Distribution Problems," the other a summary of the season's meetings to be held in Boston in April.

New York Southern Tier

The New York Southern Tier Section reports the following successful meetings held in Elmira.

November 10—"Economic Effects of Labor Saving Equipment in Industry," by James A. Shepard, Vice-President of the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. Mr. Shepard is a member of the sub-committee of the American Society of Mechanical Engineers working on an application of the formulas for computing economies of labor saving equipment, and his paper at this meeting was the first information regarding it which has been given to the public.

December 8—A Case Presentation of the Bedaux Wage Payment System, by George V. Lennon, Treasurer, Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.

January 12—"Industrial Psychology," by H. S. Person, Managing Director, Taylor Society, New York.

According to present plans C. F. Brown, Treasurer and General Manager of the Corona Typewriter Company, Inc., will address the section in February on "Labor Classification and Pay Roll Analysis"; C. E. Killinger, General Manager of the Willys-Morrow Company, will talk in March on a subject not yet selected; and Robert J. Andersen, Production Manager of the Bowen Products Corporation and Secretary and Treasurer of the Central New York Section, will address the April meeting on "Why Systems Fail."

Central New York

The fall meetings of the Central New York section were reported in the October BULLETIN. The first meeting of the new year was held in Syracuse, January 16, with a paper on "The Present State of the Art of Office Management," by Mr. W. H. Leffingwell, President, The Leffingwell-Ream Company, New York. In spite of zero weather and blocked roads, eighty members and guests attended this "highly instructive and interesting meeting."

Future meetings planned will include a talk on "Sales Analysis," and an address on "Management of Prison Industries," by Robert T. Kent, newly appointed Superintendent of Prison Industries for New York State.

Cleveland

The Cleveland Section reports a meeting January 26, with a paper on "Factory Appraisals" by Mr. Utter of the Lloyd Thomas Appraisal Company. The next meeting will be a round-table discussion using the case method.

New York Metropolitan Section

Miss Eugenia Lies, Director of Planning, R H. Macy & Co., Inc., spoke on "Scientific Management Applied to Department Store Practice" at the dinner meeting of the New York Metropolitan Section, January 22. P. J. Reilly of the Retail Research Association and W. H. Leffingwell discussed the paper.

Chicago

The last meeting of the Chicago Section was a dinner meeting January 15, followed by a round-table discussion on "Outstanding Advance in Management in 1924 in my Profession or Business."

Reviews

Scientific Management since Taylor. Edited by Edward Eyre Hunt.[1] McGraw Hill Book Company, Inc., New York, 1924. pp. xv, 263. (658.)

This important collection of authoritative articles on scientific management takes its place beside C. Bertram Thompson's earlier collection. Comparison of the two is illuminating. Thompson's collection of some fifteen years ago emphasized the fundamental principles and the technique of production—its articles concerning the human aspects of scientific management were more or less speculative. Hunt's collection emphasizes achievements, general administration and the human aspects. Scientific management is proved to be a dynamic thing which has met the challenge of new problems in industry.

In his introduction to Hunt's collection, Morris L. Cooke makes this significant statement:

"But, after all, personnel, as contrasted with material, is the dominant factor in industry . . . . It is the design of this book not only to emphasize the importance of human relations but to show how and where the beginnings have been made in organizing these relations on fundamental lines."

"On fundamental lines." In other words, scientific management takes the point of view that sound industrial relations must be established on such foundations as continuity of operations, continuous employment and precise and waste-saving methods, which make possible satisfactory working conditions, high wages and regular earnings, and make practicable participation of workers in the determination of conditions of work.

The author has made a very satisfactory grouping of articles under four headings, the first of which is "The Nature and Achievements of Scientific Management." This first group of articles reviews the nature and achievements of scientific management, emphasizing the achievements of the past decade, and establishes a background for the subsequent articles dealing with less generally understood aspects of scientific management.

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[1] Assistant to the Secretary of Commerce; Member, Committee on Elimination of Waste in Industry; Secretary, the President's Conference on Unemployment.

The second group, "Scientific Management in General Management," shows how scientific management has attacked the problem of the general management through refined and precise methods of budgeting and administrative control. It is shown how an enterprise may set itself an over-all task just as it sets tasks for each of its constituent parts.

"Stabilizing Operations and Employment" is the third group. It should be given special emphasis because here we have so much stress laid on the matter of human relations. We learn how scientific management operates under periods of depression, how it attacks the problem of reducing unemployment and what Mr. Hoover thinks about the matter of industrial standardization. It is especially interesting to note that so many of the examples of advanced constructive effort in reducing unemployment are by firms that are distinguished as representative of Taylor methods. It will come as a distinct shock to that surviving few of those who believe that scientific management considers men only as machines, to find that scientific management on the contrary is leading the attack on problems concerned with man as a human being rather than as a machine.

Scientific management, it is shown, has followed a technique which involves fundamentally the harmonizing of human relations. This is particularly manifest in the last group of articles—"Ownership, Management and Workers." Here is a gold mine of accurate information for the open-minded, too vital and important to be commented on in a few words, strongly stressing the human relations side, and from the pens of men who are leaders in the scientific management movement.

One of the articles in the last group ends thus: "Applied scientific management, then, which does not relate its science to the desires and to the thoughts of all connected with a concern in all their relations, either organized or in process of organizing, is not true to the Taylor principles." It would be hard to find a more succinct statement than this, or one that more clearly defines the position of scientific management.

Mr. Hunt is to be congratulated for bringing together articles which make a comprehensive and authoritative presentation of scientific management's logical and inevitable development and his book should be on the desk of every executive.

PERCY S. BROWN.[2]

Payment by Results. By J. E. Powell, Longmans, Green & Co., New York, 1924, pp. 405. (658.32)

The purpose of this book is to make a critical evaluation of the various methods of payment by results, both as they compare with each other and in comparison with payment by the week or on some other basis. Although there has probably been much more experimentation with payment by results in this country than in England, it has taken an English student to formulate a theoretical and scientific study of the penetrating type for which the students of economics in England have come to be famous. The reviewer knows of no similar recent American book, and G. D. H. Cole's "The Payment of Wages" is the only other book with which it bears serious comparison.

At the outset, one serious criticism upon this careful work may be noted. It is that there is no consideration of the American experience with payment by results, and indeed hardly a recognition of the fact that this large body of experience is being ignored. The force of the presentation is, therefore, in its general and theoretical discussions rather than in its specific critical comment on methods in practice.

On this theoretical side, however, the author has made at least one major point which is of real importance, and which has probably received insufficient attention at the hands of American students of management. The point is simply that before introducing a system of payment by results managers should satisfy themselves that the ends they desire to achieve are not better secured in other ways. In order to get a check on this possibility, the author asks at the outset of the book the following questions which managers should put to themselves:

"1. The ascertainment of the existing position as regards rate of production.

"2. Is payment by results the right remedy, or is the improvement required outside its scope and do other remedies require prior application?

"3. What branches of the work can be dealt with, and what will be the effect on those workers whom it may appear necessary to leave out?

"4. What will be the effect on other workers of any grade; will wage values be brought into question?

"5. What system is to be used: an individual or a collective system, and if individual, which one; if collective, on what basis?

"6. What is to be the basis of job rates?

"7. How will the system be linked up with the existing routine?"

He points out that faulty organization which would reflect itself in lowered output may be due to a great variety of causes generally treated under the designation of production control problems. And he feels that until production control problems are solved, the introduction of payment by results is in danger of raising more problems than it settles.

He points out, for instance, the danger of getting the scheme of payment of a shop out of line, by making it possible for the piece workers to earn more than more skilled workers and foremen who are being paid on a weekly salary basis.

He points out also, of course, the difficulties that have to be met in the objections which the workers have had to methods of payment by results. He states these objections as three:

"1. The cutting of job rates. 2. The shortness of work supposed to follow the introduction of payment by results. 3. That the individual system in making earnings depend upon successful individual effort encourages competition and sets one worker against another, causing jealousies and bad feeling."

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[2] Works Manager, Corona Typewriter Co., Inc., Groton, N. Y.; President, Taylor Society.

The problem of the division of earnings between management and men when production is increased by incentive payments is not faced as adequately as its importance warrants. So far as the reviewer can discover, the author dismisses this question in the following wholly unsatisfactory fashion. His treatment is the more disappointing because of the need for new and critical consideration of this too frequently ignored topic:

"The question is quite often asked why the value of the whole of the saving made is not paid to the workers; why should the manufacturer take any portion? Superficially, or if production were entirely scientific in character, and all the factors under absolute control—individual skill and energy standardized, in fact, the human factor eliminated—the answer would be in the negative; but, unfortunately, none of these conditions exist and compromises have had to be made, with the object of meeting as well as is possible a maximum of conditions which are unavoidably variable."

The conclusion on this point which Mr. Powell finally reaches is as follows:

"There appear to be but two distinct principles upon which payment can now be logically based: 1. Earnings to be entirely dependent upon and to be proportional to output. 2. Time wages to be guaranteed independently of the amount of output, extra pay to be dependent upon and to be proportional to the amount by which output is increased above a fixed minimum."

A vital major problem in the introduction and operation of systems of payment by results will be recognized to be the relation of employees to the whole rate-fixing department. The author's precise position on this vexed question is a little difficult to discover. He makes an unexceptionable statement at one point as follows:

"To obtain and retain the confidence of the workers in the system in use, and to obtain economical production, is the acid test to which all systems of payment by results will be subjected sooner or later, and it should be the aim of every chief rate-fixer to see that his department is so managed that the workers can rely, without fear, upon getting a square deal."

In this statement there is no hint of any formal method of discussion or conference between managers and men as to the adoption of rates or the acceptance of time studies. And yet a few pages further on he ventures to say that "it is to be expected that complaints will be made on the score that new job rates are not sufficient, and some effort must be made to meet those complaints in a spirit of discussion, rather than of authority, and of reasoning, rather than of bargaining. The day is gone, and rightly so, if intelligent men are to be encouraged in workshops, for blind obedience to authority to be expected . . . . ." "Anything like autocracy in this connection is to be shunned, while the more ready the firm's officials show themselves to explain and to enlighten, the more satisfactory are the results likely to be."

Certainly, on this phase of the subject, Mr. Powell's treatment is, intentionally or not, far less clear-cut and forward-looking than it might have been had he had access, for example, to the experiences of the men's and women's clothing industries in this country in operating time study and rate-fixing departments under joint employer and union control.

The book's strength will be seen to lie in its emphasis upon seeing the payment problem in relation to the technical problems of production control; and on this point its testimony is illuminating. No serious student of the payment problem can afford to ignore this study. Yet he cannot help realizing that there is need for a similar scientific analysis written by an American regarding American experience.

ORDWAY TEAD.[3]

The Causes of Industrial Unrest. By John A. Fitch.[4] Harper and Bros., New York, 1924, pp. 424. (658.31)

This is by all odds the most perspicacious book upon labor problems which has been written since Robert Hoxie's "Trade Unionism in the United States." For over fifteen years, John Fitch has been investigating at first hand the struggles between labor and capital and trying to understand the policies adopted by both sides. This book is the fine fruitage of this wealth of observation seasoned by a mature judgment which is at once warmly human in its sympathies and still objective and scientific in its attitude.

As the title of the book indicates, Mr. Fitch's object is to discover and explain the reasons for the secular increase in the dissatisfaction of the manual wage-earners with our social and industrial order. After some preliminary chapters dealing with hours of work, the menace of unemployment, and the inadequacy of the income of a large percentage of the workers to provide an adequate standard of living. Mr. Fitch comes to the struggle between labor and capital. It is here that he makes his unique contribution.

He first proceeds to analyze why the vast majority of employers prefer not to deal with the unions and at the best only tolerate them as a necessary evil. Management, he points out, is burdened with the worries and the problems necessarily involved in producing goods and attempting to make the business a success. The coming of the union means the addition of another uncertainty. The employer is afraid that the workers will force his wage-scale up to such a point as will put him at a disadvantage with his competitors. He is apprehensive lest his business become involved in sympathetic strikes or jurisdictional disputes, and most of all, he believes that the union fosters restriction of output on the part of its members, and by means of the closed shop is able to throw an almost impregnable defence around the slothful and the inefficient. It is thoroughly understandable, therefore, why the average employer tries to prevent unions from getting a foothold. His methods may be indirect, as witnessed for example in the recent rush to form shop committees, which

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[3] New York School of Social Work.

[4] Director of industrial courses, New York School of Social Work.